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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/784,899	02/24/2004	Zi-Kui Liu	59516-052	1022

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MCDERMOTT WILL & EMERY LLP  
600 13TH STREET, N.W.  
WASHINGTON, DC 20005-3096

EXAMINER

TALBOT, BRIAN K

ART UNIT PAPER NUMBER

1762

DATE MAILED: 09/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/784,899

Applicant(s)

LIU ET AL.

Examiner

Brian K. Talbot

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 17 June 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) 16 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

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1. The amendment filed 6/17/05 has been considered and entered. Claims 1-17 remain in the application.

2. This application contains claim 16 drawn to an invention nonelected with traverse in Paper filed 2/17/05. A complete reply to the final rejection must include cancellation of nonelected claims or other appropriate action (37 CFR 1.144) See MPEP § 821.01.

3. In light of the amendment filed 6/17/05, the 35 USC 112 first paragraph rejection has been withdrawn. In addition, the 35 USC 102(e), 102(a) and 103 rejection has been withdrawn concerning Zeng et al. (6,797,341). The Double Patenting Rejection has been withdrawn as well. However, the following rejection has been necessitated by the amendment.

***Claim Rejections - 35 USC § 103***

4. Claims 1-15 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics" in combination with Blank et al. "Superconducting Mg-B films by pulsed laser deposition in an in situ two-step process using multicomponent targets", Applied Physic Letters, vol. 79, no. 1, July 16, 2001 or Cava et al. "Reactivity of MgB<sub>2</sub> with common substrate electronic materials", Applied Physics Letters, vol. 80, no. 2, January 14, 2002.

Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics" teaches method of producing boride thin films that combines physical and chemical vapor deposition to

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form magnesium diboride films. Magnesium vapor is physically generated in a chamber with a substrate and a boron precursor is introduced into the chamber to form the magnesium diboride film (abstract). Carrier gases of hydrogen or nitrogen can be used to introduce the boron precursor. Pressure in the chamber is from 100-700 torr. The substrate can be a SiC. Boron sources can be diborane, boron tribromide, trimethyl boron etc. Magnesium is heated to between 700-760°C to form the vapor. MgO is suppressed at the interface of the magnesium film and the Al<sub>2</sub>O<sub>3</sub> substrate. Phase diagrams indicate only MgB<sub>2</sub> formation and no Mg-Si. (pg. 1-4).

Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics" fails to teach using a substrate consisting essentially of silicon.

Blank et al. "Superconducting Mg-B films by pulsed laser deposition in an in situ two-step process using multicomponent targets", Applied Physics Letters, vol. 79, no. 1, July 16, 2001 or Cava et al. "Reactivity of MgB<sub>2</sub> with common substrate electronic materials", Applied Physics Letters, vol. 80, no. 2, January 14, 2002 both teach forming MgB<sub>2</sub> films by CVD/PVD processes on a variety of substrates for electronic application including silicon, SiC, Al<sub>2</sub>O<sub>3</sub> and STO.

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified Zeng et al. "In situ epitaxial MgB<sub>2</sub> thin films for superconducting electronics" by substituting one known substrate (silicon) for another (SiC or Al<sub>2</sub>O<sub>3</sub>) as evidenced by Blank et al. "Superconducting Mg-B films by pulsed laser deposition in an in situ two-step process using multicomponent targets", Applied Physics Letters, vol. 79, no. 1, July 16, 2001 or Cava et al. "Reactivity of MgB<sub>2</sub> with common substrate electronic materials", Applied

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Physics Letters, vol. 80, no. 2, January 14, 2002. with the expectation of achieving similar success.

While the Examiner acknowledges the fact that the references are silent upon an interface between the magnesium film and the silicon containing substrate, it is the Examiner's position that since the process, materials and coating parameters are similar, the absence or suppression of an interface film would be achieved by the prior art. In addition, the references talk about suppressing the formation of MgO with an  $\text{Al}_2\text{O}_3$  substrate and this would suggest a suppression with other substrates.

With respect to claims 9,13-15 and 17, the claims recite a pressure of vapor following the claimed equation.

While the Examiner acknowledges this fact, it is the Examiner's position that the pressure of the vapor is a "result effective" variable that is optimized by one skilled in the art at the time the invention was made through routine experimentation. If Applicant disagrees, Applicant is invited to supply a showing of unexpected results regarding the claimed vapor pressure and the Examiner will reconsider his position. Applicant is reminded that all claims must be commensurate in scope with the showing, i.e. all the claims should require the claimed pressure equation.

***Response to Amendment***

5. Applicant's arguments with respect to claims 1-15 and 17 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argued that the prior art failed to teach a substrate consisting essentially of silicon.

Blank et al. "Superconducting Mg-B films by pulsed laser deposition in an in situ two-step process using multicomponent targets", Applied Physic Letters, vol. 79, no. 1, July 16, 2001 or Cava et al. "Reactivity of MgB<sub>2</sub> with common substrate electronic materials", Applied Physics Letters, vol. 80, no. 2, January 14, 2002 teaches MgB<sub>2</sub> coating by vapor phase processes on silicon substrates as well as a variety of other substrates including SiC, Al<sub>2</sub>O<sub>3</sub> and STO.

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,


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however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 6AM-3PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Brian K Talbot  
Primary Examiner  
Art Unit 1762

BKT